# SNAP OTA Natural Frequency Requirement
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This tech note is a discussion of minimum natural frequency requirements for the optical telescope assembly. At some later date, this discussion will be incorporated into document 00203-MW02, Interface Control Document for the Optical Telescope Assembly.

The minimum payload natural frequencies for some suitable launch vehicles are:

| **Launch Vehicle** | **Min. Lateral Frequency (Hz)** | **Min. Axial Frequency (Hz)** |
|---|---|---|
| Atlas V | Not specified | Not specified |
| Delta IV-M | 10 | 27 |
| Soyuz (payload only) | 15 | 35 |
| Soyuz (payload + adapter) | 12 | 27 |

We assume a Soyuz adapter will be stiff enough to meet the 12/27 Hz requirement if the payload meets the 15/35 Hz requirement.

Therefore, for launch, the minimum payload natural frequencies are 15 Hz lateral and 35 Hz axial, mounted to a rigid base. The compliance of the spacecraft structure between the launch vehicle and the OTA mean the natural frequencies of the OTA must be higher than 15/35 Hz. The exact increase depends on the specifics of the spacecraft and OTA designs, but for now, we assume the OTA should have natural frequencies of **20 Hz lateral and 40 Hz axial**, mounted alone on a rigid base.

In science configuration, attitude control and instrument stability requirements benefit from high OTA natural frequencies. Other, more specific requirements may therefore arise for the free-free configuration. However, for now, the requirement will remain 20/40 Hz on a rigid base.